Percent Composition and Molecular Formula Worksheet

1. What's the empirical formula of a molecule containing 63.07% carbon, 5.31% hydrogen, and 31.62% oxygen?
2. If the molar mass of the compound in problem 1 is 114 grams/mole, what's the molecular formula?
3. What's the empirical formula of a molecule containing 38.7% chlorine, 56.0% carbon, and 5.20% oxygen?
4. If the molar mass of the compound in problem 3 is 714.8 grams/mole, what's the molecular formula?

Write the molecular formulas of the following compounds:

5. A compound with an empirical formula of C_2HO_2 and a molar mass of 88 grams per mole.
6. A compound with an empirical formula of C_2H_2O and a molar mass of 126 grams per mole.
7. A compound with an empirical formula of $CHBrO$ and a molar mass of 217.7 grams per mole.
8. A compound with an empirical formula of C_2H_2N and a molar mass of 80 grams per mole.

Answer the following questions:

9. The percentage compositions of acetic acid is found to be 39.9% C, 6.7% H, and 53.4% O. Determine the empirical formula of acetic acid.
10. The molar mass for aspartame (#9 was demonstrated by experiment to be 594.6 g/mol. What is the molecular formula?
11. Aniline, a starting material for sulfonamide (sleep) drugs, consists of C, H, and N. Combustion of each compound yields CO_2, H_2O, and N_2 as products. If the combustion of 15.73 g of aniline yields 43.0 g CO_2 and 11.80 g N_2, what is the empirical formula?
12. The molar mass of aniline is 93 g/mol. What is its molecular formula?
13. Calculate the mass percent of carbon, nitrogen and oxygen in acetanilide (C_8H_9NO)
14. A 150.0 g sample of a compound made from phosphorus and chlorine is decomposed. Analysis of the products showed that 11.35 g of phosphorus were present. What is the empirical formula of the compound?
15. When 2.5000 g of an oxide of mercury (HgO_x) is decomposed into the elements by heating, 2.4811 g of mercury are produced. Calculate the empirical formula.
16. The compound benzamide has the following percent composition. What is the empirical formula?

    C = 69.40% H = 5.82% N = 11.57% O = 13.21%
17. A compound of genetic code which carries has an approximate molar mass of 330 g/mole. If the percent composition is as follows, what is the empirical and molecular formula of serine?

    C = 34.9% H = 6.84% O = 46.5% N = 11.6%